# INEQUALITIES

***Solve the following inequalities:***

1. $\frac{2x-3}{3x-7}>0$
2. $(x-1)(3-x)(x-2)^2 > 0$
3. $\frac{x^2-5x+6}{x^2+x+1}<0$
4. $\frac{x^2+2x-3}{x^2+1}<0$
5. $x^4-2x^2-63\le 0$
6. $\frac{1}{x-1}\le 2$
7. $\frac{7x-5}{8x+3}>4$
8. $\frac{x-2}{x^2+1}<-\frac{1}{2}$
9. $\frac{x^2+6x-7}{x^2+1}\le 2$
10. $\frac{(x+2)(x^2-2x+1)}{4+3x-x^2}\ge 0$
11. $\frac{2(x-4)}{(x-1)(x-7)}\ge\frac{1}{x-2}$
12. $\frac{20}{(x-3)(x-4)}+\frac{10}{x-4}+1>0$
13. $\sqrt{3x-x^2}<4-x$
14. $(x-1)^2(x+1)^3(x-4)<0$
15. $\frac{(x-1)^2(x+3)^3}{x^4(x-2)}\le 0$
16. $\frac{x^2-6x+9}{5-4x-x^2}\ge 0$
17. $\frac{5-4x}{3x^2-x-4}<4$
18. $\left(\frac{3}{2}\right)^{1+x^2}>\left(\frac{2}{3}\right)^{3x-1}$
19. $2^{3-6x}>1$
20. $16^x > 0.125$
21. $(0.3)^{2x^2-3x+6}<0.00243$
22. $\left(\frac{2}{5}\right)^{\frac{6-5x}{2+5x}}<\frac{25}{4}$
23. $(0.1)^{4x^2-2x-2}\le(0.1)^{2x-3}$
24. $\frac{2^{x-1}-1}{2^{x+1}+1}<2$
25. $2^{x+2}-2^{x+1}+2^{x-1}-2^{x-2}\le 9$
26. $\frac{2x-1}{2x^3+3x^2+x}>0$, find least x, $x\in N$
27. $\frac{x^2-13x+40}{\sqrt{19x-x^2-78}}\le 0$
28. $0<\frac{3x-1}{2x+5}<1$
29. $1\le\frac{2-x}{x+1}\le 2$
30. $1<\frac{3x-1}{2x+1}<2$

## ANSWER KEY

1. $(-\infty; 3/2)\cup(7/3+\infty)$
2. $(1, 2)\cup(2, 3)$
3. $(2, 3)$
4. $(-3, 1)$
5. $[-3, 3]$
6. $(-\infty, 1)\cup[3/2, +\infty)$
7. $(-17/25, -3/8)$
8. $(-3, 1)$
9. $(-\infty, \infty)$
10. $(-\infty, -2]\cup(-1, 4)$
11. $(1, 2)\cup(7, +\infty)$
12. $(-\infty, -2)\cup(-1, 3)\cup(4, +\infty)$
13. $[0, 3]$
14. $(-1, 1)\cup(1, 4)$
15. $[-3, 0)\cup(0, 2)$
16. $(-5, 1)\cup\{3\}$
17. $\left(-\infty, -\frac{\sqrt{7}}{2}\right)\cup\left(-1, \frac{\sqrt{7}}{2}\right)\cup\left(\frac{4}{3}, \infty\right)$
18. $(-\infty, -3)\cup(0, \infty)$
19. $(-\infty, 1/2)$
20. $(-3/4, \infty)$
21. $(-\infty, 1/2)\cup(1, \infty)$
22. $(-\infty, -2)\cup(-2/5, \infty)$
23. $x\in R$
24. $x\in R$
25. $(-\infty, 2)$
26. 1
27. $(6, 8]$
28. $\left(\frac{1}{3}, 6\right)$
29. $\left[0, \frac{1}{2}\right]$
30. $(-\infty, -3)\cup(2, \infty)$